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ABSTRACT

The question of whether ability grouping has a positive or negative effect on school children is probed. This review on the topic covers experimental studies that divide students of a certain grade within a school into classes differing in average ability level. It is limited to secondary schools in the United States. An objective and quantitative approach, meta-analysis, was used. Results show that students gained more from grouped classes than from ungrouped ones. The effects of grouping on student attitudes toward subject matter were more striking than the effects of grouping on student achievement. Effects of grouping on attitudes toward school and self concept were also positive. This meta-analysis confirmed some common beliefs about the effects of grouping, and provided quantitative estimates of the size of grouping effects based on a large number of diverse studies. (Author/GK)

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Effects of Ability Grouping on Secondary School Students

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A Symposium Paper Presented at the Annual Meeting

Of the American Educational Research Association

Los Angeles, April, 1981

TM 810 504

The basic question that I will try to answer this morning is whether ability grouping has a positive or negative effect on school children? The question should be a familiar one to teachers and educational researchers. Few questions about classroom organization have been around for so long; few have stirred so much controversy; and few have inspired so much research.

The first serious attempt to study the effects of ability grouping in a controlled experiment was made in 1916. Numerous studies followed soon after so that by 1936, when the National Society for the Study of Education published a yearbook on grouping, eight comprehensive reviews were available on the topic (Whipple, 1936). One of these reviews alone contained 140 references, including 108 reports of experimental studies (Billett, 1932). In the years since, researchers have continued to study grouping, and reviewers have tried to make sense of their findings.

The central message from these reviews, however, is that nothing has been established with certainty. The earliest reviews and the most recent concluded that there is no clear evidence that ability grouping is either harmful or beneficial. Only the emphasis of the reviewers has changed with the passing years. In the 1950's, reviewers often found some support in the literature for the idea that grouping is especially beneficial for high aptitude students. In today's era of equal educational opportunity, the tide has gradually turned against ability grouping. Today's reviews often focus on possible negative effects of the practice, especially for disadvantaged students and especially in the areas of self-concept and achievement motivation.

It is impossible for any single review to cover ability grouping in all its aspects. This review covers experimental studies that divide students of a certain grade within a school into classes differing in average ability level. It does not cover studies of inter-school grouping (where students are assigned to different types of schools on the basis of test scores); studies of intra-class grouping (where students are grouped and regrouped within a classroom for instruction in particular subjects); studies of rapid promotion; and studies of nongraded schools. This review is further limited to studies at the secondary school level in schools in the United States.

This review differs from other reviews in methodology. Unlike earlier reviews, which used narrative and box-score methods to synthesize research findings, this review employs an objective and quantitative approach. The method is called "meta-analysis," or the analysis of analyses. The term was first used by Glass (1976) to describe the statistical analysis of a large collection of results from individual studies for the purpose of integrating the findings. In the rest of my talk this morning, I will show how we used meta-analysis to draw dependable conclusions about the effects of ability grouping on secondary school students.

Method

The first step in this meta-analysis was to collect a large number of comparative studies that examined effects of grouping on secondary school

children. An extensive search located 41 studies. The studies came from journal articles, dissertations, and ERIC documents.

The grouping procedures used in these studies were of several different types. We first described the grouping procedures on three dimensions: whether the grouping was based on a specific aptitude (i.e., a mathematics or reading test) or on a measure of general aptitude; whether special materials appropriate for ability level were used in the different groups; and whether group assignments lasted for the duration of the experiment or changed during the term (i.e., grouping was flexible). The 41 studies also differed from one another on other dimensions: in their experimental designs, in their settings, and in their publication features. We classified the studies in as many ways as possible to reflect all these sources of variation.

The 41 studies contained findings on effects of grouping in four major areas: overall student achievement, self-concept, attitude toward subject matter, and attitude toward school. Findings on student achievement were based on examination scores, and findings on self-concept and on attitudes toward school and school subjects were based on questionnaire items or scales. To quantify outcomes in each of these areas, we used the Effect Size (ES), defined as the difference between the means of two groups divided by the standard deviation of the control group (Glass, 1976).

Results

In the time remaining I will first describe the overall performance on achievement examinations of students from grouped and ungrouped classes. I will then examine the effects of grouping on student attitudes and on self-concepts.

| Insert Figure 1 about here |

Achievement

This figure shows the size of the gains reported in the 41 studies of grouping effects. Size of the gain is given on the X-axis in standard-deviation-units, while number of studies reporting gains of each size is given on the Y-axis. In 70% of the studies, the examination scores were better in the grouped classes; and in 30% of the studies, examination scores were better in the ungrouped classes. The average ES in the 41 studies was .13. This means that in a typical class, performance of ability grouped students was raised approximately one-eighth of a standard-deviation-unit, or that students from grouped classes performed at the 55th percentile on their examinations, whereas students who received only conventional instruction performed at the 50th percentile on the same examinations. Or put in another way, 55% of the students from grouped classes outperformed the average student from the ungrouped classes. Although this ES is large enough to be considered statistically significant, it is nevertheless a very small effect.

We also wanted to know whether the studies that reported large effects differed systematically from those reporting small effects. We therefore examined the relationship between study outcomes and characteristics. Six study characteristics were significantly correlated with size of effect. Regression analysis showed that four of these made independent contributions to size of effect. These were: the ability level of the group, manner of publication, whether materials taught were adjusted for ability, and whether the material taught covered different subject areas. The other two variables--random assignment of students and class level of students--contributed very little to the multiple regression equations.

| Insert Figure 2 about here |

This figure shows the effects of adjusting of material to the ability of the group. In those studies where material was adjusted to ability level, effects were stronger than in those studies where no adjustment was made in instructional material.

| Insert Figure 3 about here |

This figure shows how manner of publication related to size of effect. Effects reported in journal articles and in ERIC documents were stronger than effects reported in dissertations.

| Insert Figure 4 about here |

This figure shows that effects were larger when the material taught and tested covered a combination of different subjects; effects were small when students were grouped only for a single class in a specific subject matter.

| Insert Figure 5 about here |

This final figure shows that effects were largest when the ability level of the student population studied was high or in the gifted range; effects were near zero when less restricted populations were studied or when the ability level of the student population was low.

Self-Concept

Thirteen studies reported data on student self-concept. In six studies, self-concept was higher for students in grouped classrooms; in five studies, self-concept was higher for students from ungrouped classrooms; and in two studies, self-esteem was equal for the the two groups. The average ES in these studies was .13. This effect was a small

one, and was not large enough to be considered statistically reliable over studies.

Attitudes toward Subject Matter

Eight studies provided data on student attitudes toward the subject matter taught in grouped and ungrouped classrooms. In each of these eight studies grouping was used only for teaching a specific subject matter--for example, mathematics or English composition--and not for an entire school program. In seven of the studies, student attitudes were more positive in the grouped class, but in one study, attitudes were more positive in the ungrouped class. The average ES was .37. Even though the number of studies available was small, results were consistent enough for us to conclude with statistical confidence that grouping had a positive effect on student attitudes toward the subject being taught.

Attitudes toward School

Another 11 studies provided data on attitudes of students toward the school they were attending. In eight of the studies, the students from grouped classes expressed more favorable attitudes toward their schools; in the other three studies, the attitudes of the students from ungrouped classes were more favorable. The average ES in these studies was .09. This effect is a very small one at best, and was not large enough to be considered statistically reliable.

Discussion

What meta-analysis established about grouping seems clear enough. Meta-analysis showed that students gained somewhat more from grouped classes than they did from ungrouped ones. The benefits of grouping tended to be small in the typical study of achievement--an increase from the 50th to the 55th percentile for the typical student in a grouped class. One subgroup of studies, however, produced especially clear effects. In this type of study students of high ability, or "gifted" students, were put into a special honors class for enriched instruction in their secondary school subjects. Studies of this type usually reported significant results, and they usually reported effects on achievement that were medium in size. High ability students apparently benefited from the stimulation provided by other high aptitude students and from the special curricula that grouping made possible.

The effects of grouping on student attitudes were more striking than the effects of grouping on student achievement. Effects were positive in nearly all the studies of attitudes toward subject matter, and in the typical study these attitudinal effects were medium in size. Effects of grouping on attitudes toward school and on self-concept were also positive, but these effects were smaller and less consistent.

Our conclusions about achievement effects were generally consistent with findings of earlier reviewers, but our attitudinal results were not. Recent reviewers have tended to emphasize the negative effects of grouping on the attitudes and self-concepts of low ability students. Such

conclusions, however, were based primarily on anecdotal and uncontrolled studies. The controlled studies that we examined gave a very different picture of the effects of grouping on student attitudes. Students seemed to like their school subjects more when they studied them with peers who were like themselves, and students may have even developed more positive attitudes about themselves and about school in grouped classes.

This meta-analysis thus confirmed some common beliefs about the effects of grouping, and it showed that other common beliefs are not supported by the facts. More important, however, this meta-analysis provided precise, quantitative estimates of the size of grouping effects, based on a large number of diverse studies. We believe that these estimates give researchers and policy makers alike a new starting point for planning future policy and research in this area.

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Figure Captions

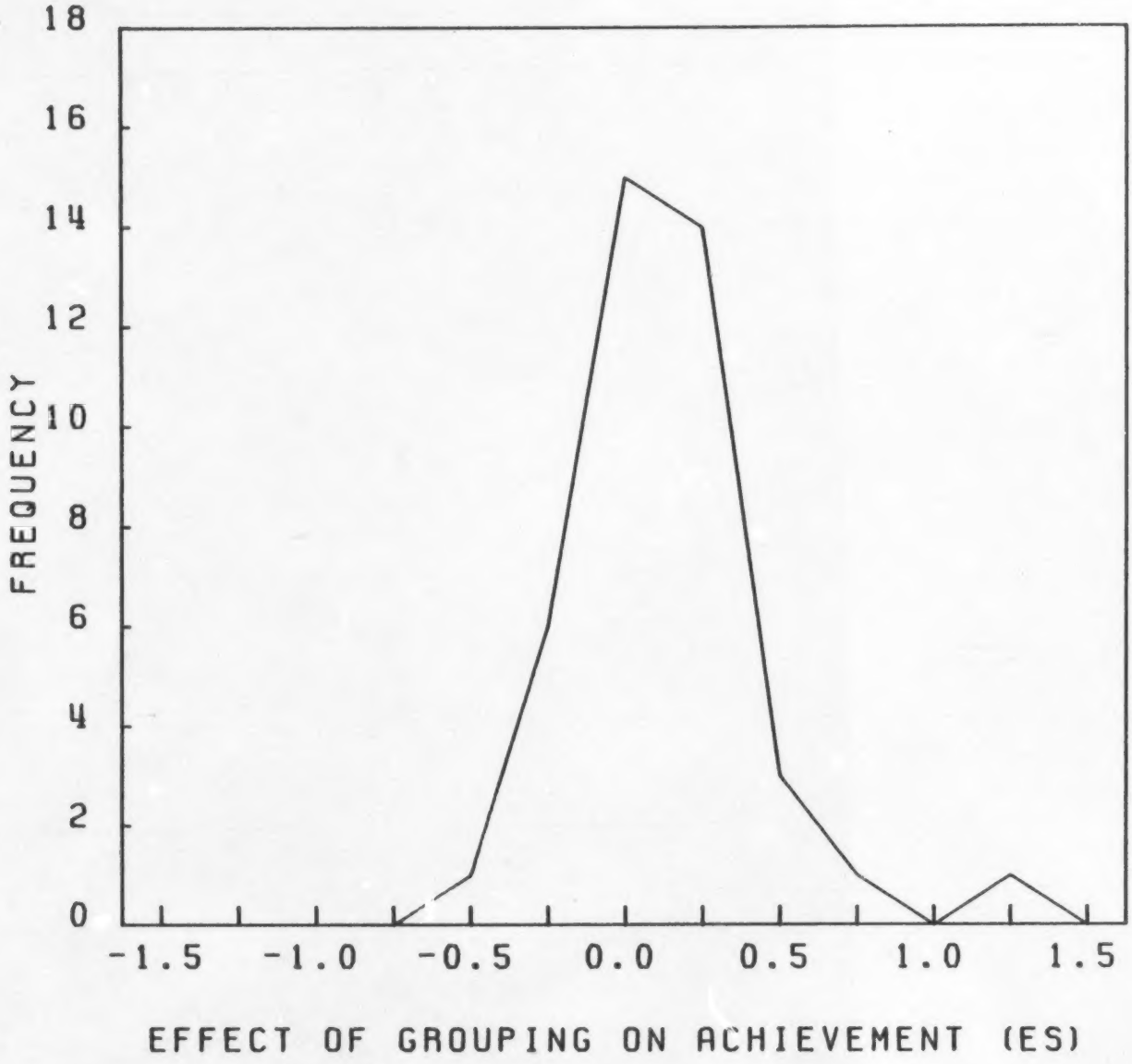
Figure 1. Distribution showing the effects of grouping on achievement in 41 studies.

Figure 2. Average effect of grouping on achievement when teaching material is and is not adjusted to ability level of group.

Figure 3. Average effect of grouping on achievement in studies reported in journals and in studies reported in dissertations.

Figure 4. Average effect of grouping on achievement in studies covering a single school subject and in studies covering all school subjects.

Figure 5. Average effect of grouping on achievement in studies of students at different ability levels.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EFFECT OF GROUPING ON ACHIEVEMENT (ES)

Figure 1

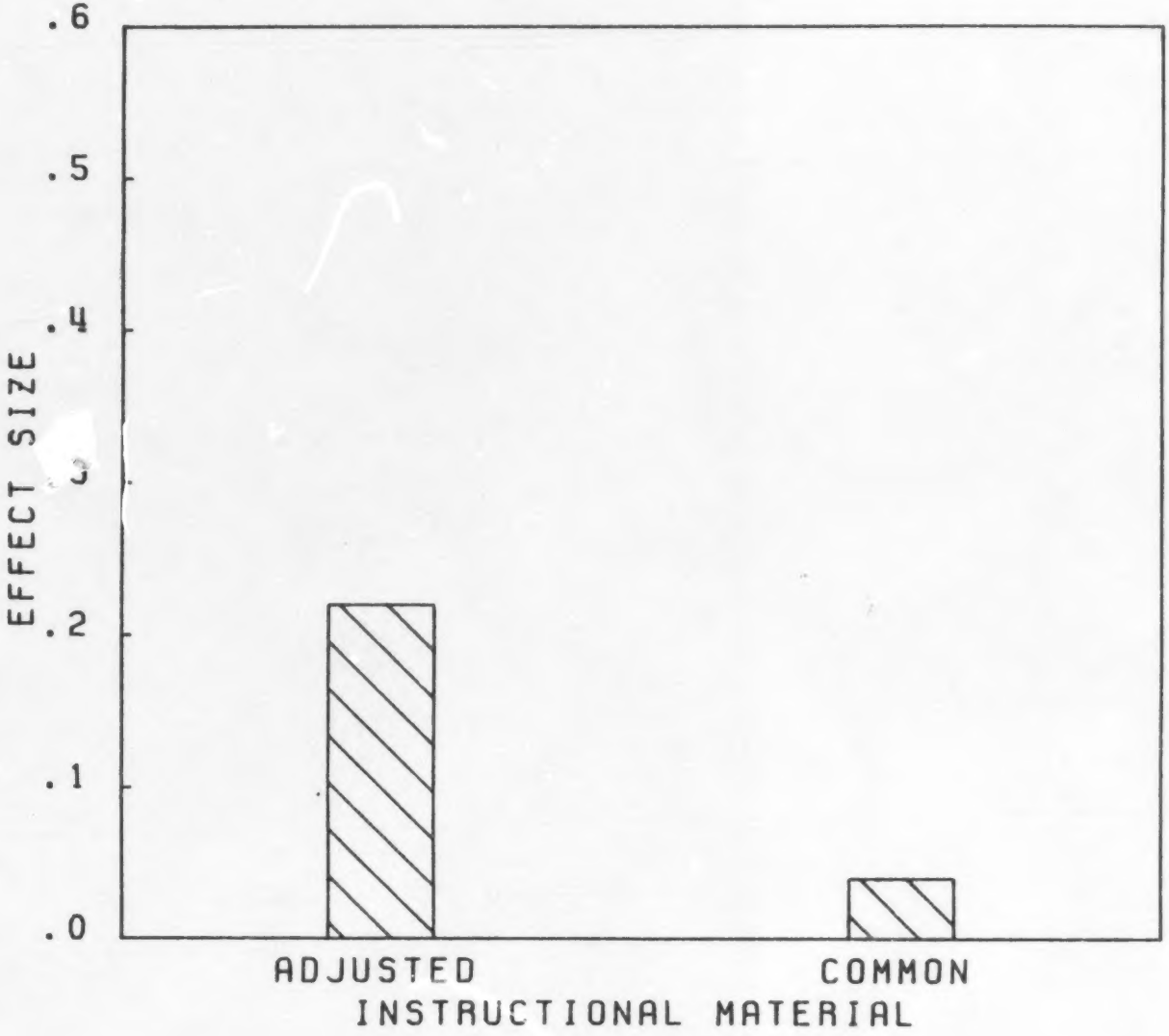
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Figure 2

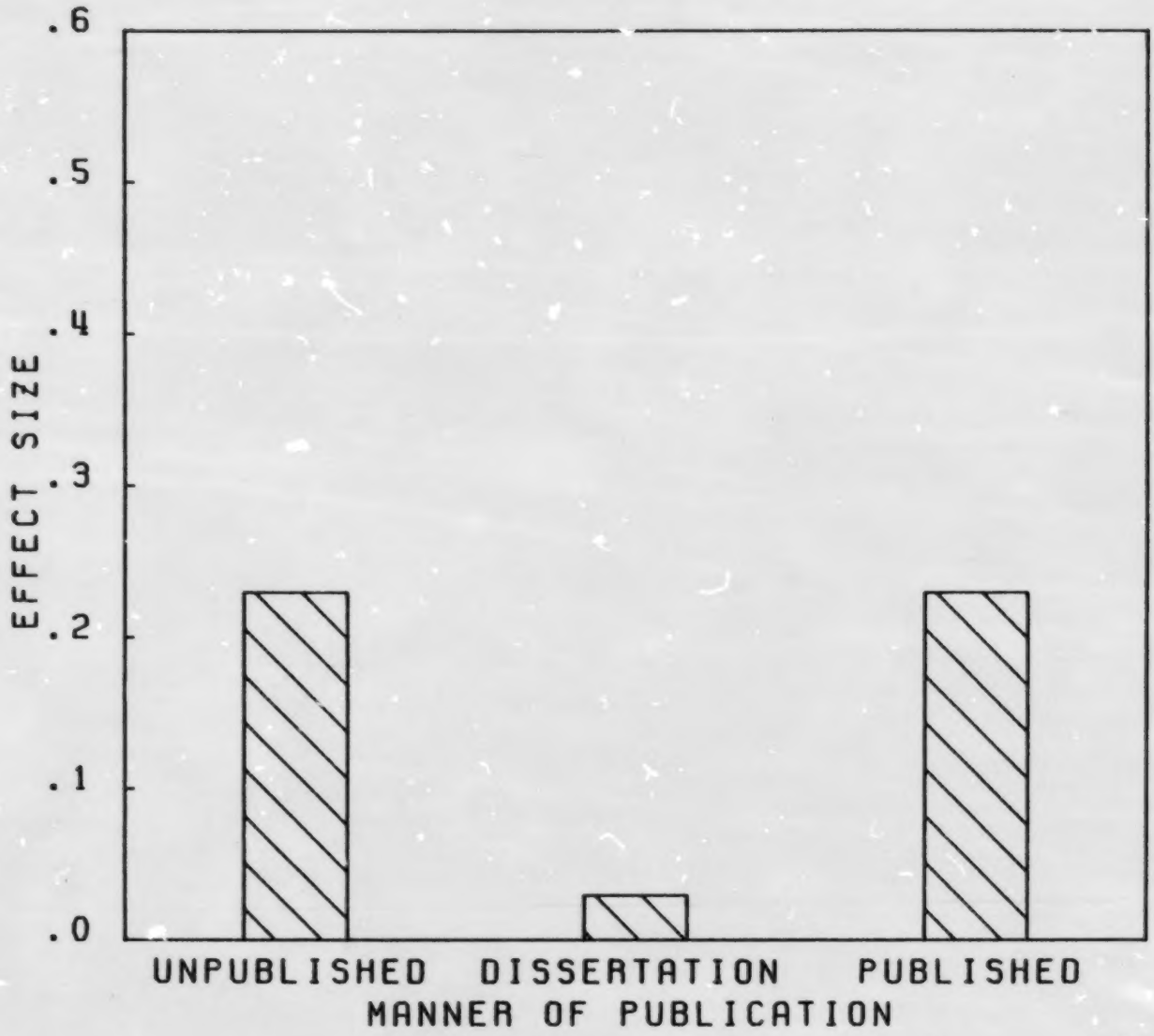
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Figure 3

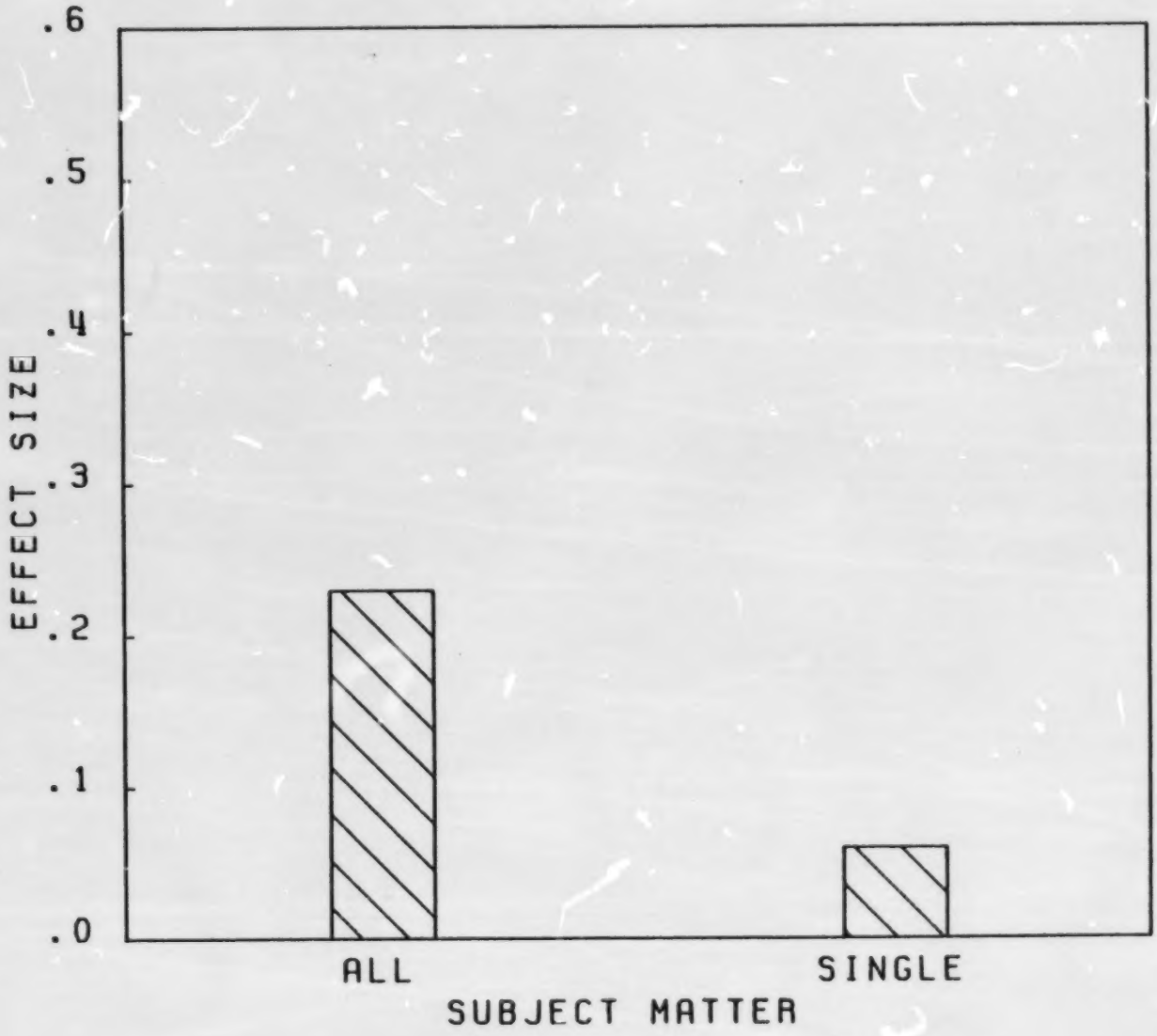

Figure 4

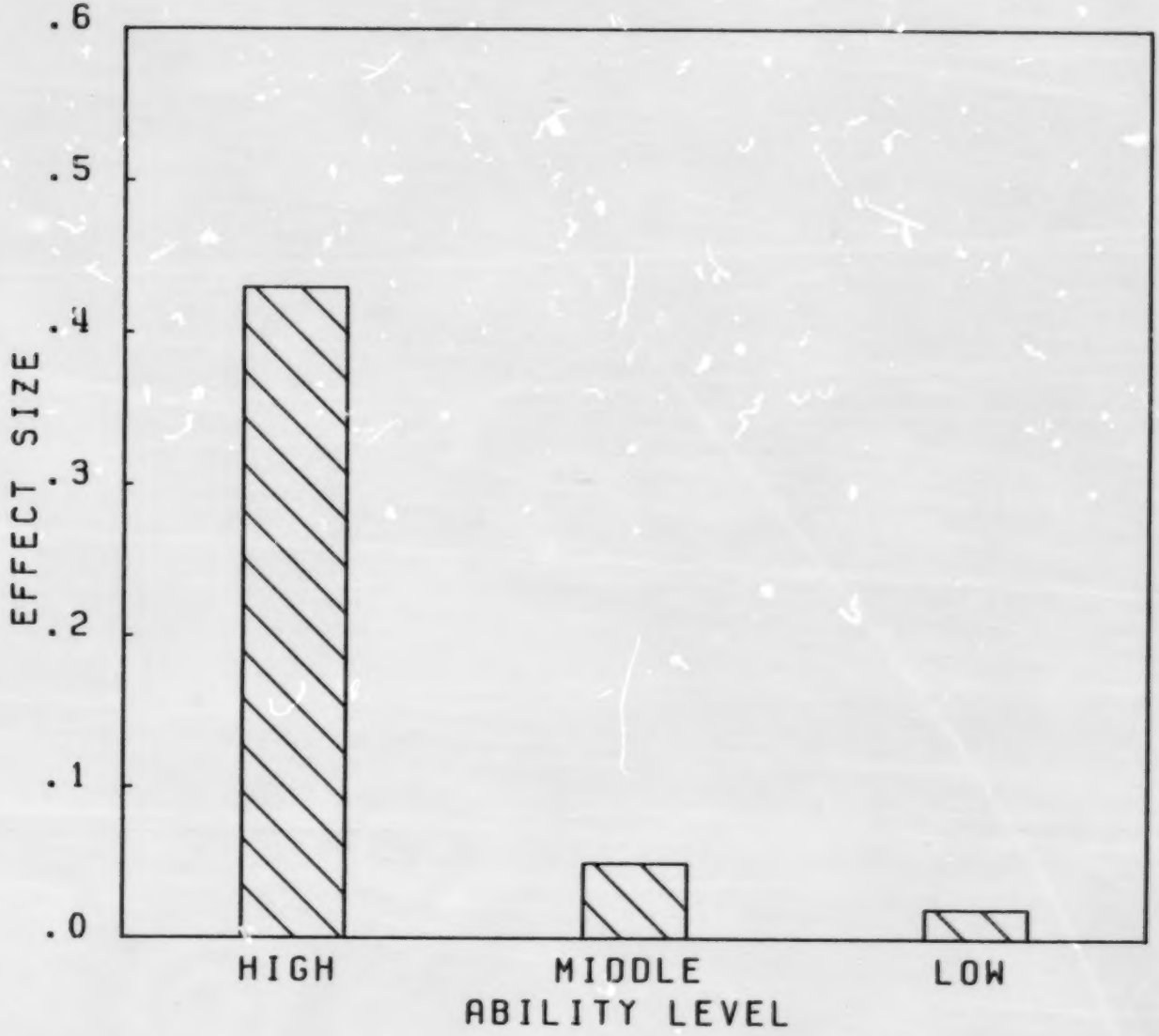

Figure 5